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Ameliorative effect of *Jibanti* (*Desmotrichum fimbriatum* Bl) on clinical, haematobiochemical and oxidative profiles of Geriatric dogs

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Research pertaining to geriatric canine care is very limited in India and abroad despite its strong urgency considering the emotional attachment of patients' owner is concerned.

Desmotrichum fimbriatum Blum (DF), syn. *Dendrobium macraii* Lindl (Family: Orchidaceae), an orchid plant, is native to Bangladesh and India, particularly to Darjeeling, Khasi and Sikkim Hills. The plant is traditionally known as *Jibanti* used in Ayurveda as antioxidant, hepatoprotective, immunoenhancer and also as major remedy in various infectious diseases (Datta *et al.* 2002).

Oxidative injury and stress are the most important concerns in the aging process. Free radicals have been implicated in various cellular processes leading to the age related disorders. Therefore, the antioxidants are generally presumed to retard the aging process (Chakraborty *et al.* 2001). Various herbal products were considered for antioxidant therapy in geriatric diseases in human being. Therefore, the present study was undertaken to evaluate the effect of *Jibanti* on the geriatric dogs.

The present study was carried out in the Department of Veterinary Medicine, Ethics and Jurisprudence, West Bengal University of Animal and Fishery Sciences, Kolkata. With prior consent from the owner, 12 geriatric dogs (11.3±1.34 years) were selected randomly with no obvious clinical manifestations but complaints of mild depression, small reduction in food intake and dull hair coat, and were divided into 2 groups with 6 animals each. All the dogs were kept under the supervision of the owners with standard diet, care and management.

The plant was purchased from Kolkata local market and authenticated by Botanical Survey of India. Whole plant was extracted in 70% alcohol. The extract was dried in rota vapour and the solid was dissolved in honey (20 mg/ml concentration). In the treatment group, dogs were administered dried 70% aqueous ethanolic extract with honey @ 2 ml/10 kg body weight daily for 21 days while the control dogs received only honey, @ 2 ml/10 kg body weight daily for 21 days. Blood and serum samples were collected on 0 and 21 days following administration, and subjected to estimate haematological, viz. Hb, TEC, TLC and DLC following standard technique. Serum biochemical profiles, viz. total protein, albumin, globulin, glucose, total serum cholesterol, HDL cholesterol, urea nitrogen, creatinine, glutamate oxaloacetate transaminase, glutamate pyruvate transaminase, creatine kinase and alkaline phosphatase; serum mineral profile like calcium, phosphorus, sodium and potassium were performed using commercially available reagents.

DPPH scavenging activity (Mellors and Tappel 1996) of the plant extract, ABTS radical cation decolorisation assay (Miller *et al.* 1993) and serum malonyldialdehyde (Esterbauer and Cheeseman 1990) level were determined as described previously.

Statistical analysis was performed by 'Pair sample T test' using SPSS (version 10.0). Level of significance was determined at $P<0.01$ and $P<0.05$.

There was gradual improvement in food intake, behavioural pattern, activity pattern and body coat texture of geriatric dogs following treatment with *Jibanti*. Strong antioxidant activity of *Jibanti* was observed *in vitro* as reflected by marked reduction in the colour development using ABTS radical color reduction assay and DPPH scavenging assay, IC_{50} being 19.41 and 147.63 µg/ml respectively.

Similarly, in the dogs following treatment with *Jibanti*, level of oxidative stress was decreased when compared to the control group without any treatment as depicted by ABTS

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Table 1. Haematological and biochemical parameters in control (honey) and experimental groups (mean±SE)

Parameter	Control		Experimental	
	Day 0	Day 21	Day 0	Day 21
Haemoglobin (g/dl)	11.991±0.124	11.974±0.124	11.738±0.132	12.714±0.247* [a]
Total erythrocyte count (10^6/mm^3)	5.517±0.156	5.483±0.180	5.233±0.235	5.483±0.185*
Total leucocyte count (10^3/mm^3)	8.617±0.464	8.550±0.406	8.650±0.536	8.967±0.490**
Neutrophil (%)	65.167±.0.543	66.000±0.683	63.833±3.060	60.833±2.386**[a]
Eosinophil (%)	4.500±0.428	4.500±0.428	4.500±0.563	3.500±0.224*
Basophil (%)	0	0	0	0
Lymphocyte (%)	27.500±0.619	26.500±0.847	29.200±3.734	32.200±2.800*[a]
Monocyte (%)	2.833±0.0307	3.167±0.167	2.167±0.307	3.167±0.167*
Total protein (g/dl)	5.927±0.020	5.963±0.032	5.846±0.044	5.958±0.035*
Albumin (g/dl)	2.747±0.064	2.729±0.055	2.734±0.034	2.751±0.066
Globulin (g/dl)	3.180±0.058	3.233±0.071	3.158±0.073	3.190±0.077
Albumin: globulin	0.867±0.036	0.847±0.036	0.855±0.031	0.875±0.041
AST (IU/L)	56.333±11.848	59.333±12.968	58.000±9.668	46.333±7.265**[a]
ALT (IU/L)	31.667±2.895	32.667±2.617	30.500±2.291	25.333±1.926**[a]
CK (IU/L)	56.535±1.458	57.011±1.466	55.946±1.167	54.369±1.430
ALP (IU/L)	57.922±0.604	58.184±0.592	59.046±0.629	50.517±1.418**[a]
Serum urea nitrogen (mg/dl)	23.068±0.556	22.476±0.893	23.877±0.663	19.651±0.576**
Serum creatinine (mg/dl)	1.421±0.011	1.358±0.043	1.366±0.029	1.035±0.019**[a]
Total cholesterol (mg/dl)	238.621±1.382	238.010±1.521	227.077±2.980	221.760±1.377[a]
HDL cholesterol (mg/dl)	16.027±0.204	15.056±0.445	16.191±0.230	16.882±0.367
Glucose (mg/dl)	116.555±1.024	116.047±0.961	113.129±0.503	110.136±0.417**[a]
K (mEq/L)	4.140±0.052	4.058±0.051	4.257±0.078	4.161±0.073
Na (mEq/L)	145.187±3.179	147.097±3.168	136.656±3.954	138.706±2.770
Ca (mg/dl)	10.024±0.010	10.001±0.095	9.781±0.056	10.180±0.056**
P (mg/dl)	5.405±0.047	5.049±0.215	5.436±0.070	5.389±0.079
ABTS decolorisation assay	1.732±0.042	1.693±0.021	1.691±0.056	1.282±0.219*
Plasma MDA level (n mol/ml)	2.637±0.052	2.592±0.034	2.506±0.032	2.04±0.096*

n=6, animals; P values: *<0.05; **<0.01; [a] indicate significant decrease (P<0.05) on day 21 between control and experimental groups. Statistical analysis was performed between 0 and 21 day in each group and between 21 days of control and experimental groups.

radical cation decolorization assay and plasma MDA level (Table 1) although the differences were not statistically significant, which may be due to small number of animals under study.

Previously also, the drug was known to protect from the trichloromethyl free radicals (CCl_3^-) induced oxidative injuries and membrane damage in mice and geriatric dogs (Datta *et al*. 2002). The antioxidant activity of *Desmotrichum fimbriatum* as seen in the present study indicated its protective effect on degenerative changes in geriatric dogs from oxidative stress due to age. The antioxidative potential of *Jibanti* could be attributed to several compounds like sesquiterpenes, triterpenoids and other alkaloids present in the plant, which were earlier reported to weaken the lipid peroxidation and slow down all kinds of stress induced peroxidative damage including old age (Pereire *et al*. 1995).

After 21 days of treatment significant (P<0.05) increase of Hb concentration in animals was observed that may be due to stimulation of the hepatic activity. The increased level of TEC in experimental group was probably due to the effect of the plant extract on haemopoietic system including augmentation of erythropoietin secretion in kidney or stimulation of bone marrow (Satyavati *et al*. 1987). Similarly the increase in TLC in treated group following treatment was supposed to be due to immunomodulatory effect of the plant extract. Increase in lymphocyte and monocyte count in drug treated group following treatment indicated the efficacy of the plant extract in stimulating the immunity of the aged dogs (Gulati *et al.* 2002). Decreased neutrophil percentage in drug treated group may suggest the efficacy of the plant in counteracting stressor inflammatory reactions in the body. Increased level of total protein and decreased level of AST and ALT in DF treated group might be due to the hepato-protective activity of the plant extract. Decreased level of serum urea nitrogen and creatinine suggested its strong rejuvenating effect on kidney by improving glomerular filtration. Reduction in total cholesterol level suggests some hypocholesterolaemic effect of the plant extract consequential to the hepato-protective activity of it. Lower value of glucose in DF treated group might be due to stimulation on glucose metabolism through pancreatic cells. Increased serum Ca^+ level following treatment might be

probably due to the direct effect of the plant extract on kidney for synthesis of active form of vitamin D that helps in absorption of Ca^+ from gut and reabsorption of Ca^+ from distal renal tubules.

Many *rasayan* plants exhibit similar bioactivities (Kanase *et al*. 1994) like *D. fimbriatum.* The pronounced effect of the plant on different parameters on geriatric dogs in liver function and kidney function test is possibly due to prevention of oxidative stress showing the activity. Plant metabolites responsible for the observed activity yet to be isolated and identified in detail. Present study indicated that the plant can be widely adopted for geriatric canine care.

SUMMARY

The present study was conducted to explore the ameliorative effect of ethanolic extract of *Jibanti* on the geriatric dogs. There was significant clinical recovery and improvement of haematobiochemical and oxidative profile of the dogs following administration of *Jibanti.* The present investigation indicated the efficacy of the extract to protect the aged dogs from oxidative injuries induced by aging.

REFERENCES

Chakraborty M, Dutta G, Ghosh S and Debnath P K. 2001. Induction of antioxidant enzyme by the Ayurvedic herb *Desmotrichum fimbriatum* Bl. *Indian Journal of Experimental Biology* **39**: 485–86.

Datta G K, Chakrabarty M, Ghosh S and Debnath P K. 2002. Hepatoprotective effect of *Desmotrichum fimbriatum* Bl in mice with carbon tetrachloride-induced liver damage. *Journal of Biomedical Research* **13** (213): 81–84.

Esterbauer H and Cheeseman K. 1990. Determination of aldihydic lipid peroxidation products, malonyldialdehyde and 4–hydroxynal. *Methods in Enzymology* **186**: 407–20.

Gulati K, Ray A, Debnath P K and Bhattacharya S K. 2002. Immunomodulatory Indian medicinal plants. *Journal of Natural Remedies* **212**: 121–31.

Kanase R, Patil S and Kanase A. 1994. Effect of hepatoprotective ayurvedic drugs on lysosomal enzymes during hepatic injury induced by single dose CCl_4. *Indian Journal of Experimental Biology* **32**: 328–32.

Mellors A and Tappel A L. 1996. The inhibition of mitochondrial peroxidation by ubi and ubiquinol. *Journal of Biological Chemistry* **241**: 4353–56.

Miller N J, Rice-Evans C, Davies M J, Gopinathan V and Milner A. 1993. A novel method for measuring antioxidant status in premature neonates. *Clinical Sciences* **84**: 407–12.

Pereire B, Costa Rosa F B P, Safi D A, Bechara E J H and Cusi R. 1995. Hormonal regulation of superoxide desmutase, catalase and glutathione peroxidase activities in rat macrophages. *Biochemical Pharmacology* **50**: 2093.

Satyavati G V, Gupta A K and Tandon N. 1987. *Medicinal Plants in India.* V-II, Indian Council of Medical Research, New Delhi.